Planning for the Future of Erosion Management in Alaska

Bruce R Sexauer PE

Alaska District US Army Corps of Engineers

Overview

- **The Alaskan Perspective**
- **Planning for Erosion Risk Management**
- **Taking Action Now**
- **Statewide Assessment and Prioritization**
- **Coordinating with Stakeholders**

The Alaskan Perspective

Alaska Erosion Programs

- **Alaska Village Erosion Technical Assistance Program (AVETA)**
  - **Tribal Partnership Program, Section 203, WRDA 2000, Public Law 106-51**
- **Alaska Coastal Erosion**
  - **Section 117 of the Energy and Water Development Appropriations Act, 2005, Public Law 108-447**
- **Baseline Erosion Assessment**
  - **Energy and Water Development Appropriations Act, 2005, Public Law 108-447**

AVETA Communities and Questions

Bethel

Dillingham

Kaktovik

Kivalina

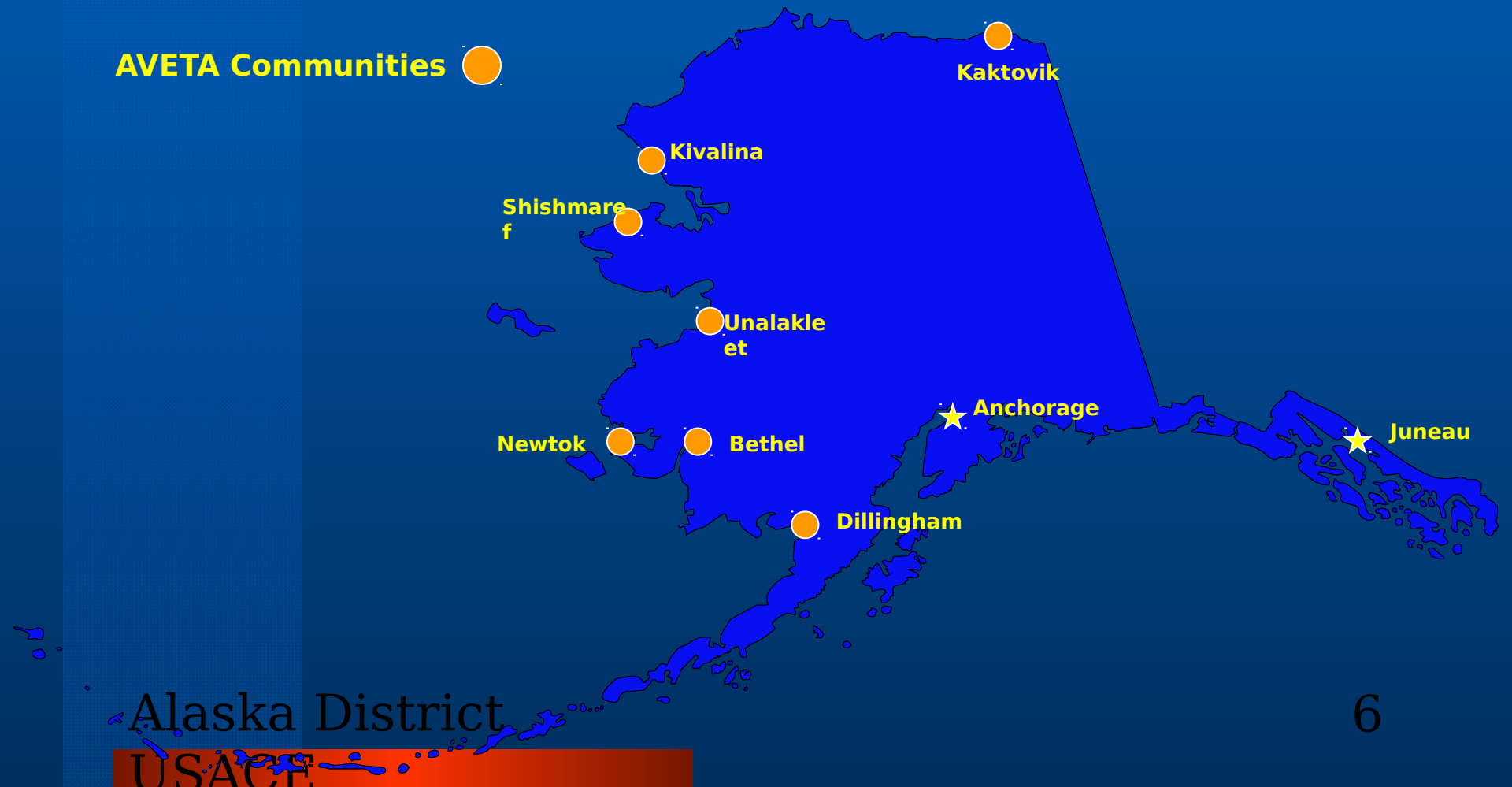
Newtok

Shishmaref

Unalakleet

- **What is the cost of the erosion?**
- **What does it cost to relocate?**
- **How long does the village have left?**

AVETA Communities



AVETA Planning Issues

- **Who selects the new site?**
- **What are the criteria for selecting the new site?**
- **Does the community move all at once?**
- **What is to be done with the existing site?**
- **Should the community be moved as-is or should it be upgraded?**
- **What needs to happen first for relocation?**

AVETA Planning Issues Continued

- **What is the timeline for relocation?**
- **What costs are directly related to erosion and which are related to other issues?**
- **What agency has the lead?**
- **Do existing programs have sufficient funding?**
- **Is relocation worth the cost?**
- **How does climate change effect erosion in Alaska?**

AVETA - Kivalina

- **What is the cost of the erosion?**
  - ***$14 million***
- **What does it cost to relocate?**
  - ***$68 million***
- **How long does the village have left?**
  - ***Not determined***

AVETA - Newtok

- **What is the cost of the erosion?**
  - ***$89 million***
- **What does it cost to relocate?**
  - ***$93 million***
- **How long does the village have left?**
  - ***10 to 15 years***

AVETA - Shishmaref

- **What is the cost of the erosion?**
  - ***$50 million***
- **What does it cost to relocate?**
  - ***$150-200 million***
- **How long does the village have left?**
  - ***10 years***

Alaska Coastal Erosion

"SEC. 117. Notwithstanding any other provision of law, the Secretary of the Army is authorized to carry out, at full Federal expense, structural and non-structural projects for storm damage prevention and reduction, coastal erosion, and ice and glacial damage in Alaska, including relocation of affected communities and construction of replacement facilities."

Section 117 Activities

- **Kivalina – Revetment Planned**
- **Newtok – Emergency Shelter**
- **Shishmaref – Partial Construction Complete**
- **Unalakleet – Revetment Planned**
- **Koyukuk – Emergency Shelter**

Shishmaref Revetment

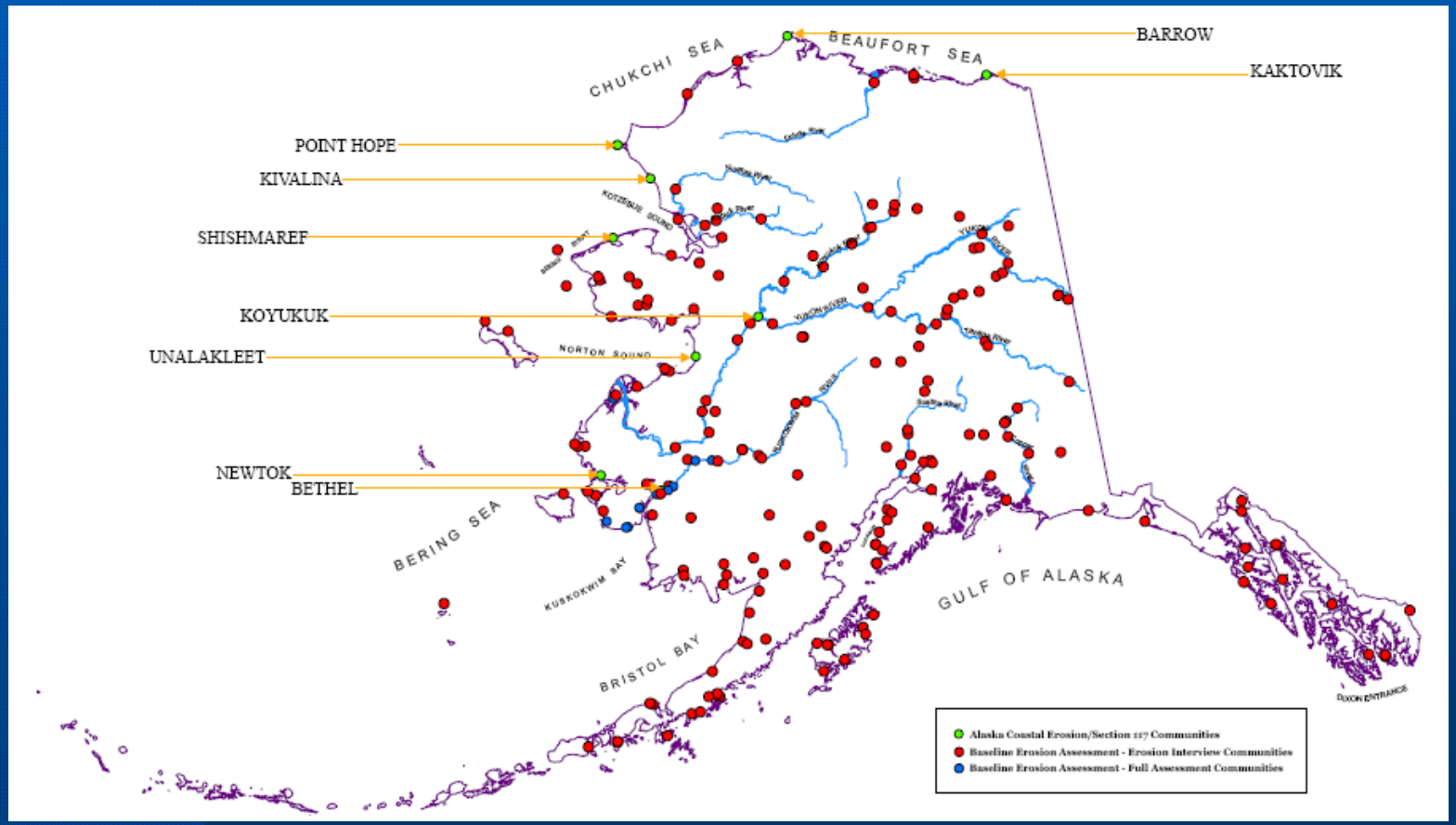
Post 2004 Erosion

Installed Revetment

AVETA – Baseline Erosion

"The conference finds there is a need for an Alaska erosion baseline study to coordinate and plan the appropriate responses and assistance for Alaska villages in the most need and to provide an overall assessment on the priority of which villages should receive assistance. Therefore, the conference has provided the $2,000,000 for this study."

Alaska Communities With Erosion

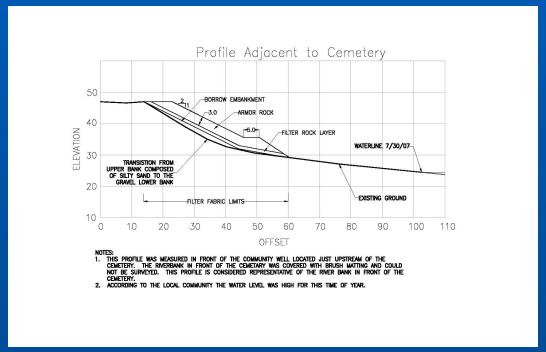


Assessment Process

- **Inter Agency Coordination**
- **Detailed Erosion Assessments**
- **Erosion Information Papers**
- **Expedient Erosion Projects**

Baseline Assessment Products

Expedited Measures


Profile Adjacent to Cemetery
ELEVATION
OFFSET
BORROW EMBANKMENT
ARMOR ROCK
FILTER ROCK LAYER
WATERLINE 7/30/07
TRANSITION FROM UPPER BANK COMPOSED OF SILTY SAND TO THE GRAVEL LOWER BANK
FILTER FABRIC LIMITS
EXISTING GROUND
NOTES:
1. THIS PROFILE WAS MEASURED IN FRONT OF THE COMMUNITY WELL LOCATED JUST UPSTREAM OF THE CEMETERY. THE RIVERBANK IN FRONT OF THE CEMETARY WAS COVERED WITH BRUSH MATTING AND COULD NOT BE SURVEYED. THIS PROFILE IS CONSIDERED REPRESENTATIVE OF THE RIVER BANK IN FRONT OF THE CEMETERY.
2. ACCORDING TO THE LOCAL COMMUNITY THE WATER LEVEL WAS HIGH FOR THIS TIME OF YEAR.

Prototype Solutions

Baseline Prioritization Strategy

- **What Are We Really Prioritizing?**
- **What Criteria and Factors Are Be**
- **Ho dr**
  Ur

Shishmaref Shoreline

Preserving the Catch

Prioritization Factors

- **Critical Infrastructure**
- **Human Health and Safety**
- **Subsistence and Shoreline Use**
- **Community Setting**
- **Housing and Population Affected**
- **Housing in Parallel**
- **Environmental Hazard**
- **Cultural Importance**
- **Commercial/ Non-Residential**

Curing Seal Skins

Boat Construction

ATTACHMENT 1 - DRAFT COMMUNITY RANKING METHODOLOGY												
SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFOMRATION IN EIPS		**Community 1**	**Community 2**	**Community 3**	**Community 4**	**Community 5**	**Community 6**	**Community 7**	**Community 8**	**Community 9**	**Community 10**	**Community 11**	**Community 12**
SEVERITY OF DAMAGE:													
Critical Infrastructure (for example, School, Utilities, Transportation)	***(1) LOW IMPACT:*** *• One item of critical community infrastructure at risk • Loss of infrastructure would not result in loss of community sustainability • Damage could be repaired or alternative service restored in less than 1 month*	0	1	1	1	1	1	2	2	2	3	3	3
	(2) MEDIUM IMPACT: *• More than one item of critical community infrastructure at risk • Loss would not result in loss of community sustainability • Damage could be repaired or alternative service restored between 1 and 6 months*												
	(3) HIGH IMPACT: *• More than one item of critical community infrastructure at risk • Loss would impact community sustainability • Repaired or establishment of alternative service would take more than 6 months*												

ATTACHMENT 1 - DRAFT COMMUNITY RANKING METHODOLOGY												
SCORES FOR COMMUNITY RANKING CRITERIA BASED UPON INFOMRATION IN EIPS		Community 1	Community 2	Community 3	Community 4	Community 5	Community 6	Community 7	Community 8	Community 9	Community 10	Community 11	Community 12
DAMAGE SCORE:		0	18	18	18	18	18	36	36	36	54	54	54
TIME UNTIL DAMAGE:													
TIME UNTIL DAMAGE RATING	*Enter One of Following Values or Select from Drop Down List:* *3 for Short Term (1 to 10 Years)* *2 for Mid Term (10 to 20 years)* *1 for Long Term (20 years and beyond)*	1	2	2	2	2	3	1	2	3	1	2	3
CONFIDENCE IN TIME UNTIL DAMAGE RATING	*Enter Closest of following Values or Select from Drop Down List:* *25% Confidence Rating (Hunch)* *50% Confidence Rating (Educated Guess)* *75% Confidence Rating (Think so)* *100% Confidence Rating (Sure)*	25%	25%	50%	75%	100%	25%	25%	75%	100%	25%	75%	100%
COMMUNITY RANKING SCORES:													
COMMUNITY RANKING SCORE:		0	36	36	36	36	54	36	72	108	54	108	162
CONFIDENCE RANGE LOW:		0.0	22.5	27.0	31.5	36.0	40.5	36.0	63.0	108.0	54.0	94.5	162.0
CONFIDENCE RANGE HIGH:		0.0	49.5	45.0	40.5	36.0	54.0	63.0	81.0	108.0	94.5	121.5	162.0

Other Activities

- **Alaska Immediate Action Workgroup**
- **Newtok Relocation Taskforce**
- **Denali Commission**
- **NOAA Coordination**
  - **AOOS**
  - **ARCTic ISP**
- **Telling the Story**

In Summary

- **Addressing Alaska Erosion Important and Challenging**
- **Out of the Box Planning Required**
- **Already Turning Dirt**
- **Much More to Come**
- **Coordinate, Coordinate, Coordinate**

Planning for the Future of Erosion Management in Alaska